CLAIMS

1. A water-based pigment dispersion in which a pigment is dispersed with a thermoplastic resin containing a water soluble or self-emulsifying carboxylic group, characterized in that
the ratio of the pigment to the thermoplastic resin containing the carboxylic group (pigment/thermoplastic resin containing carboxylic group (weight ratio of effective solid matter)) is 10/10 to 10/1,
the thermoplastic resin containing the carboxylic group is cross-linked with a cross-linking agent after the pigment is dispersed with the thermoplastic resin, and
the ratio of the cross-linking agent to the thermoplastic resin containing the carboxylic group (cross-linking agent/thermoplastic resin containing carboxylic group (weight ratio of effective solid matter)) is 1/100 to 50/100.

2. The water-based pigment dispersion of Claim 1, wherein the thermoplastic resin containing a water soluble or self-emulsifying carboxylic group is an acrylic resin or a polyurethane, and the thermoplastic resin has number average molecular weight of 2000 to 20000 and acid value of 30 to 300.

3. The water-based pigment dispersion of Claim 1, wherein the cross-linking agent is an aqueous polymer of which reaction point for cross-linking is carboxylic group.

4. The water-based pigment dispersion of Claim 1, wherein

the cross-linking agent is an aqueous oligomer containing (meth)acryloyl group.

5. The water-based pigment dispersion of Claim 1, wherein the thermoplastic resin containing the carboxylic group before dispersion is neutralized with an organic amine and the organic amine has boiling point of at most 200℃.

6. The water-based pigment dispersion of Claim 1, wherein the thermoplastic resin containing the carboxylic group, which is cross-linked, has gel percent of at least 30 % and number average molecular weight of more than 100000.

7. The water-based pigment dispersion of Claim 1, wherein the pigment which is dispersed has average particle size of at most 200 nm, and
the absorbancy ratio of the dispersion calculated in accordance with the equation (I):

$$\text{Absorbancy ratio} = \frac{\text{Absorbancy of supernatant liquid after centrifugal treatment}}{\text{Absorbancy before centrifugal treatment}} \times 100 \quad \text{(I)}$$

in which centrifugal treatment is carried out under the condition of 8000 revolution/5 min. and 10000 G, and the absorbancy is a measured value of top peak in a diluted solution prepared by diluting 1 g of the pigment amount with 5 L of ion-exchange water is 10 to 100.

8. A process for preparing the water-based pigment dispersion of Claim 1, characterized in that the process comprises

(1) a step for predispersing a pigment and a thermoplastic resin containing a water soluble or self-emulsifying carboxylic group to give a mixture,

(2) a step for treating the mixture by a dispersing machine and dispersing the pigment with the thermoplastic resin containing the carboxylic group to give a dispersion,

(3) a step for cross-linking the thermoplastic resin containing the carboxylic group in the dispersion with a cross-linking agent, and

(4) a step for adjusting pH of the dispersion containing the pigment and the thermoplastic resin containing the carboxylic group, which is cross-linked, to alkaline range,

wherein pH of the dispersion at finishing cross-linking reaction is 6.0 to 8.0.

9. A water-based ink containing the water-based pigment dispersion of Claim 1.